

## Message Text

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PAGE 01 TOKYO 06634 060937Z  
ACTION OES-07

INFO OCT-01 EUR-12 EA-09 ISO-00 AID-05 CEA-01 CIAE-00  
COME-00 EPG-02 DODE-00 EB-07 FPC-01 H-02 INR-07  
INT-05 L-03 NSAE-00 NSC-05 OMB-01 PM-04 USIA-15  
SP-02 SS-15 STR-04 TRSE-00 ACDA-10 FEA-01 PA-02  
PRS-01 /122 W

-----070359Z 042071 /12

R 060844Z MAY 77  
FM AMEMBASSY TOKYO  
TO SECSTATE WASHDC 7511  
INFO ERDA HQ WASHDC  
ERDA HQ GERMANTOWN MD  
AMEMBASSY LONDON

UNCLAS TOKYO 6634

FOR OES/NET

E.O. 11652: N/A  
TAGS: ENRG, SENV, JA  
SUBJECT: JAPANESE DEVELOPMENT OF OCEAN WAVE ENERGY GENERATOR  
AND OCEAN THERMAL POWER GENERATOR

REF: A) LONDON 5711 B) 76 TOKYO 14586

1. THE OCEAN ENERGY DEVELOPMENT CO. LTD., A JOINT VENTURE  
OF MITSUI ENGINEERING AND SHIPBUILDING CO. LTD. AND POWER  
ENGINEERING LABORATORY CORP., HAS ANNOUNCED COMMENCEMENT  
OF A SERIES OF SEA TESTS ON AN OCEAN WAVE GENERATOR DEVELOPED  
BY THE COMPANY. THE PROTOTYPE, NAMED "FRIENDSHIP ONE", IS  
A COLUMN 1.2 METERS IN DIAMETER AND 22 METERS LONG WHICH  
WEIGHS 13.5 TONS. IT IS ESTIMATED TO HAVE A MAXIMUM OUTPUT  
OF 5 KW. THE OPERATING PRINCIPLE OF THE SYSTEM IS RATHER  
INGENIOUS. THE NATURAL OSCILLATION PERIOD OF A FLOATING  
BUOY IS ADJUSTED (BY ADDITION OR REMOVAL OF SEAWATER BALLAST)  
TO EQUAL THE OCEAN WAVE PERIOD THE BUOY (A VERTICAL  
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COLUMN) THEN HEAVES UP TO 20 TIMES THE WAVE HEIGHT  
DUE TO THE RESONANCE EFFECT. A COUNTER-ROTATING,  
VARIABLE PITCH PROPELLER MOUNTED ON THE BOTTOM OF THE  
BUOY IS DRIVEN BY THE RELATIVE VELOCITY OF WATER IN  
EITHER DIRECTION. THE PROPELLER DRIVES A GENERATOR TO  
PRODUCE ELECTRIC POWER CONTINUOUSLY.

2. THE INITIAL REPORT FROM THE COMPANY INDICATES THAT TESTING OF THE PROTOTYPE HAS JUST BEGUN AND RESULTS WILL NOT BE KNOWN FOR SOME TIME. HOWEVER, TANK TESTS ON SMALLER MODELS WERE PROMISING AND THE COMPANY IS ENTHUSIASTIC OVER THE POSSIBILITY OF USING SYSTEMS OF SIMILAR MACHINES TO PROVIDE POWER TO REMOTE SITES SUCH AS ISLAND COMMUNITIES WHICH PRESENTLY MUST RELY ON MORE EXPENSIVE POWER SOURCES.

3. AT SAGA UNIVERSITY, PROF. HISAO KUSUDA AND PROF. HARUO UEHARA, TOGETHER WITH A TEAM OF ENGINEERS FROM THE FACULTY OF ENGINEERING, HAVE DEVELOPED A PROTOTYPE POWER GENERATOR WHICH USES OCEAN THERMAL GRADIENTS AS THE ENERGY SOURCE AND FREON AS THE OPERATING FLUID IN A THERMODYNAMIC CYCLE. THE FREON IS VAPORIZED BY HIGHER TEMPRATURE SEAWAATER AND CONDENSED BY LOWER TEMPERATURE WATER. THE SUCCESS OF THE SAGA UNIVRSITY PROTOTYPE IS ATTRIBUTED TO THE EFFICIENT HEAT EXCHANGER DEVELOPED BY THE RESEARCH TEAM. IN A RECENT DEMONSTRATION RUN THE TURBINE REACHED 2,440 RPM AND THE GENERATOR PRODUCED 211 WATTS.

4. EMBASSY POUCHING PAPERS RECEIVED FROM OCEAN ENERGY DEVELOPMENT CO., LTD., AND SAGA UNIVERSITY ON EACH OF THESE PROJECTS TO OES/NET.  
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## Message Attributes

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**Disposition Approved on Date:**  
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**Reference:** 77 LONDON 5711, 76 TOKYO 14586  
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**Subject:** JAPANESE DEVELOPMENT OF OCEAN WAVE ENERGY GENERATOR AND OCEAN THERMAL POWER GENERATOR  
**TAGS:** ENRG, SENV, JA  
**To:** STATE  
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**Review Markings:**  
Margaret P. Grafeld  
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